



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,104	10/03/2001	Motohiro Suzuki	SIW-013	1403
959	7590	06/02/2004	EXAMINER	
LAHIVE & COCKFIELD, LLP. 28 STATE STREET BOSTON, MA 02109			ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/970,104

Applicant(s)

SUZUKI ET AL.

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 8-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5 and 12-15 is/are rejected.
- 7) ☒ Claim(s) 2-4, 6 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This action is in response to the amendment filed 03/08/04. The applicant has overcome the objection and one of the 35 USC 102 rejections. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments. However, the present claims (including newly submitted claims 14-15) are newly rejected for the reasons of record:

Election/Restrictions

1. This application contains claims 8-11 drawn to an invention nonelected with traverse in Paper No. 7. A complete reply to the final rejection must include cancelation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1, 5 and 12-15 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 5 of U.S. Patent No. 6554261 in view of

Art Unit: 1745

applicant's admitted prior art in the US application 09/970104 (*herein after referred to as APA'104*).

Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The US patent'261 claims the following (CLAIM 5):

5. A humidifier for a fuel cell system comprising:
a housing;

a plurality of bundles of water permeable hollow fiber membranes provided in the housing, each of the bundles having a large number of the water permeable hollow fiber membranes arranged along a longitudinal direction of the housing, wherein two different gases containing different water contents are supplied, one of the two different gases containing large water contents being passed through an inside the water permeable hollow fiber membranes, while the other gas containing lesser water contents being passed through an outside

US 6,554,261 B2

15

of the water permeable hollow fiber membranes, respectively, to exchange water contents to humidify the gas containing lesser water contents; and
a temperature adjustment means that utilizes cooling water heated by cooling a fuel cell of the fuel cell system to heat and cool one of an exhaust gas dis-

16

charged from the fuel cell and introduced to said humidifier and the bundles of the hollow fiber membranes so as to maintain temperature thereof substantially at a temperature of the fuel cell in operation.

* * * * *

As to the specific preamble reciting "for a fuel cell system" and "reactive gas and off-gas flow relationship", it is pointed out that the preamble and limitations refer to intended use. That is, the claim is directed to "a humidifier" per se and the preamble phrase "for a fuel cell" is only a statement of ultimate intended utility.

Further, given that no specific fuel cell structure has been positively claimed, it is also contended that the recited flow relationship of both the reactive gas and the off-gas is an ultimate utility. Thus, since claim 5 of the US patent'261 does encompass supplying two different gas containing different water contents wherein of the two gases is being passes through an inside the water permeable hollow fiber membrane while the other gas containing lesser water contents being passed through an outside of the hollow fiber membranes, it is contended that

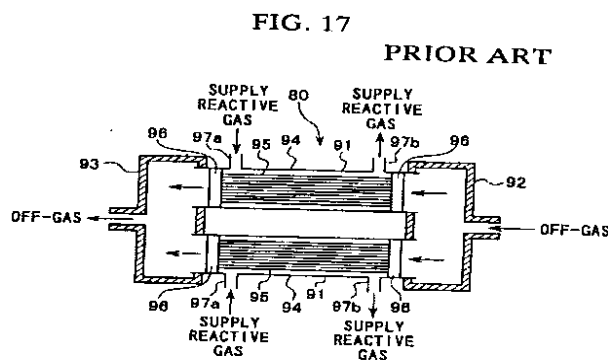
Art Unit: 1745

claim 5 of US patent '261 satisfies the requirement of having both gases i.e. the reactive gas and the off-gas themselves.

It is also noted that the examiner has interpreted that "the liquid exhaust mechanism which exhausts liquid" can be the same "reactive gas exit" itself or "the off-gas exit" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "reactive gas exit" and/ or "the off-gas exit" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit.

The US patent'261 claims a humidifier according to the foregoing aspects. However, the US patent'261 do not expressly claim the specific placement of the liquid exhaust mechanism.

The APA'104 teaches a conventional humidifier for a fuel cell as follows (SECTION 0014-0016/ Figure 17):



As shown in Figure 17 above, the humidifier has a liquid exhaust mechanism including two supply reactive gas outlets: an upper supply reactive gas outlet 97b and a lower supply reactive gas outlet 97a as indicated by stream flow arrow in Figure 17. Thus, it is noted that the lower supply reactive gas outlet 97a from which humidified supply reactive gas is exhausted is positioned below both the off-gas flow entrance as well as below, at least, an upper supply

reactive gas inlet 97a. Thus, the humidifier of Figure 17 satisfies the required functional and structural relationship of the claimed invention.

It is also noted that the examiner has interpreted that "the liquid exhaust mechanism which exhausts liquid" can be the same "reactive gas exit" itself or "the off-gas exit" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "reactive gas exit" and/ or "the off-gas exit" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit.

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to place the liquid exhaust mechanism of the US patent'261 as taught by the APA'104 as it is known in the art to efficiently remove humidity accumulated inside the humidifying unit by providing a liquid removing feature employing gravity as the driving force. Thus, power consumption associated with the operation of the humidifying unit is reduced, and thus, energy/power is more efficiently used. *Moreover, it has been held that making a feature separable or rearrangement of parts is obvious. Succinctly stated, fact that a claimed a feature of a device/apparatus is made separable or being re-arranged is not sufficient by itself to patentably distinguish over an otherwise old device unless there are new or unexpected results as it is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed humidifier was significant. In re Larson 144 USPQ 347, 349. In re Dulberg 129 USPQ 348, 349. In re Stevens 101 USPQ 284. In re Lindberg 93 USPQ 23.*

Art Unit: 1745

4. Claims 1, 5 and 14-15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/764277 (*Patent Application Publication US 2001/0021467*) in view of applicant's admitted prior art in the US application 09/970104 (*herein after referred to as APA '104*).

Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application '277 claims the following (CLAIM 1):

1. A humidifier having a plurality of water-permeable hollow fiber membranes placed along the lengthwise direction of a housing accommodated within the housing in which gases each having a different moisture content flow

inside and outside said hollow fiber membranes to carry out moisture exchange whereby the dry air having a low moisture content is humidified, said humidifier comprising a gas inlet which introduce the gas flowing outside the hollow fiber membranes within the housing formed on an end of the lengthwise direction of the housing.

As to the specific preamble reciting "for a fuel cell system" and "reactive gas and off-gas flow relationship", it is pointed out that the preamble and limitations refer to intended use. That is, the claim is directed to "a humidifier" per se and the preamble phrase "for a fuel cell" is only a statement of ultimate intended utility.

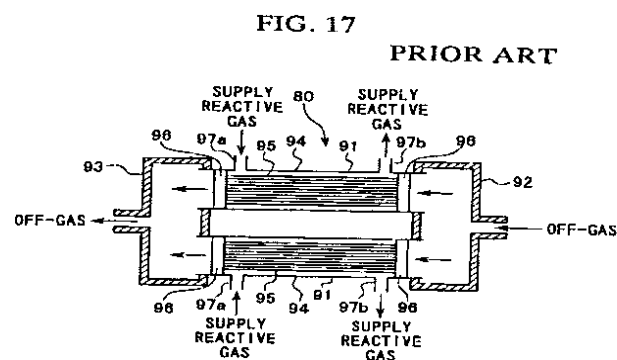
Further, given that no specific fuel cell structure has been positively claimed, it is also contended that the recited flow relationship of both the reactive gas and the off-gas is an ultimate utility. Thus, since claim 1 of the copending application '277 does encompass flowing gases each having a different moisture content inside and outside the hollow fiber membrane, it is contended that claim 1 of copending application '277 satisfies the requirement of having both gases i.e. the reactive gas and the off-gas themselves.

Art Unit: 1745

It is also noted that the examiner has interpreted that "the liquid exhaust mechanism which exhausts liquid" can be the same "reactive gas exit" itself or "the off-gas exit" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "reactive gas exit" and/ or "the off-gas exit" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit.

The copending application'277 claims a humidifier according to the foregoing aspects. However, the copending application'277 do not expressly claim the specific placement of the liquid exhaust mechanism.

The APA'104 teaches a conventional humidifier for a fuel cell as follows (SECTION 0014-0016/ Figure 17):



As shown in Figure 17 above, the humidifier has a liquid exhaust mechanism including two supply reactive gas outlets: an upper supply reactive gas outlet 97b and a lower supply reactive gas outlet 97b as indicated by stream flow arrow in Figure 17. Thus, it is noted that the lower supply reactive gas outlet 97b from which humidified supply reactive gas is exhausted is positioned below both the off-gas flow entrance as well as below, at least, an upper supply

reactive gas inlet 97a. Thus, the humidifier of Figure 17 satisfies the required functional and structural relationship of the claimed invention.

It is also noted that the examiner has interpreted that "the liquid exhaust mechanism which exhausts liquid" can be the same "reactive gas exit" itself or "the off-gas exit" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "reactive gas exit" and/ or "the off-gas exit" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit.

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to place the liquid exhaust mechanism of the copending application'277 as taught by the APA'104 as it is known in the art to efficiently remove humidity accumulated inside the humidifying unit by providing a liquid removing feature employing gravity as the driving force. Thus, power consumption associated with the operation of the humidifying unit is reduced, and thus, energy/power is more efficiently used. *Moreover, it has been held that making a feature separable or rearrangement of parts is obvious. Succinctly stated, fact that a claimed a feature of a device/apparatus is made separable or being re-arranged is not sufficient by itself to patentably distinguish over an otherwise old device unless there are new or unexpected results as it is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed humidifier was significant. In re Larson 144 USPQ 347, 349. In re Dulberg 129 USPQ 348, 349. In re Stevens 101 USPQ 284. In re Lindberg 93 USPQ 23.*

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5 and 14-15 are rejected under 35 U.S.C. 102(a) as being anticipated by applicant's admitted prior art in the US application 09/970104 (*herein after referred to as APA'104*).

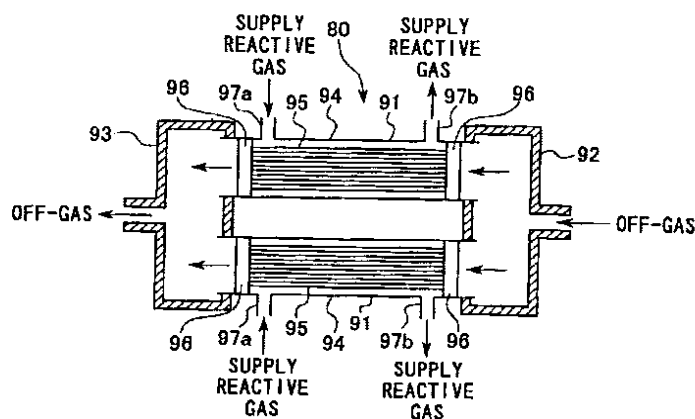
The present application is directed to humidifier wherein the disclosed inventive concept comprises the specific liquid exhaust mechanism.

As to claims 1, 5 and 14-15:

The APA'104 teaches a conventional humidifier for a fuel cell as follows (SECTION 0014-0016/ Figure 17):

FIG. 17

PRIOR ART



Art Unit: 1745

[0014] FIG. 17 shows the humidifier for oxidizing agent 80A and the humidifier for fuel 80B (hereinafter jointly referred to as humidifier 80 unless there is a need to distinguish them). The humidifier 80 comprises a plurality of humidifying units 91, and an entrance head 92 and an exit head 93 which join the humidifying units 91 in parallel. The humidifying units 91 comprise a great number of tube-like porous hollow fiber membranes 95, which are bundled together inside a cylindrical housing 94. The porous hollow fiber membrane is consisted of steam vapor-permeable membranes (water-permeable membranes). Partitioning members 96 tie both ends of the hollow fiber membranes 95, and achieve an airtight seal between the outer surfaces of the hollow fiber membranes 95, and between the outer surfaces of the hollow fiber membranes 95 and the housings 94. One end of the housings 94 is connected to the entrance head 92, and the other end is connected to the exit head 93. Gas entrances 97a and gas exits 97b are provided in the outer peripheral section of the housings 94 further inward from the partitioning members 96. The gas entrances 97a of the housings 94 are connected together via an unillustrated connection path, provided outside the housings 94. Similarly, the gas exits 97b are connected together via an unillustrated connection path, provided outside the housings 94.

[0015] In the humidifier 80, reactive gas is supplied from the gas entrance hole 97a in the housing 94 of each humidifying unit 91, passing between the hollow fiber membranes 95 of the housings 94 and exiting from the gas exit 97b. On the other hand, off-gas is supplied to the entrance head 92, from the entrance head 92 to the housing 94 of the humidifying unit 91 and into the hollow section of the hollow fiber membrane 95, passing through the hollow section and from the other side of the housing 94 into the exit head 93, and exiting from the exit head 93.

[0016] The hollow fiber membranes 95 have countless capillary tube sections running parallel to the diameter;

steam vapor in the off-gas, which is fed into the hollow sections of the hollow fiber membranes 95, condenses in the capillary tube sections and moves to the outer peripheral side, where it is transferred by evaporation to reactive gas. That is, the humidifier 80 transfers the water in the off-gas to the reactive gas, thereby humidifying the reactive gas.

As to the specific preamble reciting "for a fuel cell system" and "reactive gas and off-gas flow relationship", it is pointed out that the preamble and limitations refer to intended use. That is, the claim is directed to "a humidifier" per se and the preamble phrase "for a fuel cell" is only a statement of ultimate intended utility.

Further, given that no specific fuel cell structure has been positively claimed, it is also contended that the recited flow relationship of both the reactive gas and the off-gas is an ultimate utility. Thus, since the APA '104 does encompass flowing gases each having a different

Art Unit: 1745

moisture content inside and outside the hollow fiber membrane, it is contended that the APA'104 satisfies the requirement of having both gases i.e. the reactive gas and the off-gas themselves.

It is also noted that the examiner has interpreted that "the liquid exhaust mechanism which exhausts liquid" can be the same "reactive gas exit" itself or "the off-gas exit" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "reactive gas exit" and/ or "the off-gas exit" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit.

As shown in Figure 17 above, the humidifier has a liquid exhaust mechanism including two supply reactive gas outlets; an upper supply reactive gas outlet 97b and a lower supply reactive gas outlet 97b as indicated by stream flow arrow in Figure 17. Thus, it is noted that the lower supply reactive gas outlet 97b from which humidified supply reactive gas is exhausted is positioned below both the off-gas flow entrance as well as below, at least, an upper supply reactive gas inlet 97a. Thus, the humidifier of Figure 17 satisfies the required functional and structural relationship of the claimed invention.

Thus, the instant claims are anticipated.

Allowable Subject Matter

7. The following is a statement of reasons for the indication of allowable subject matter: a reasonable search for the prior art failed to reveal or fairly suggest what is instantly claimed, particularly: the specific water blockage detecting unit as recited in claim 2; the specific storing

unit and supplementary humidification unit as recited in claim 3; and the specific output power detecting unit and controller as recited in claims 4 and 7.

8. Claims 2-4 and 6-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 12-13 has been rejected under the judicially created doctrine of obviousness-type double patenting.

Response to Arguments

Applicant's arguments filed 03/08/04 have been entirely considered but they are not fully persuasive in view of the art rejection over the APA'104. Thus, the 35 USC 102 rejection over the APA'104 art is herein maintained. However, the art rejection over the APA'277 has been overcome.

The main contention of applicants' arguments is now premised on the assertion that the prior art fails to reveal or fairly suggest that "the liquid exhaust mechanism is provided below the off-gas flow entrance or below the supply gas flow exit". However, this assertion is respectfully disagreed with because: i) the examiner has interpreted that "the liquid exhaust mechanism which exhausts liquid" can be the same "reactive gas exit" itself or "the off-gas exit" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "reactive gas exit" and/ or "the off-gas exit" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit; and ii) as shown in Figure 17 above, the humidifier has a liquid exhaust mechanism including two supply reactive gas outlets: a first upper supply reactive gas outlet 97b

Art Unit: 1745

and a second lower supply reactive gas outlet 97b as indicated by stream flow arrow in Figure 17. Thus, it is noted that the lower supply reactive gas outlet 97b from which humidified supply reactive gas is exhausted is positioned below both the off-gas flow entrance as well as below, at least, an upper supply reactive gas inlet 97a. Thus, the humidifier of Figure 17 satisfies the required functional and structural relationship of the claimed invention.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "*the liquid exhaust mechanism is separate from the off-gas exit*") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In that, it is noted that the claims simply recite "*a liquid exhaust mechanism which exhaust liquid, which has been generated from the off-gas flowing through the off-gas entrance or from the gas fed through the supply gas flow exit*". Consequently, the examiner has interpreted that "*the liquid exhaust mechanism which exhausts liquid*" can be the same "*reactive gas exit*" itself or "*the off-gas exit*" as such, because they are able to exhaust liquid which has been generated therethrough. In that, the "*reactive gas exit*" and/ or "*the off-gas exit*" are inherently recited by the claim because gas entrances and exits are necessarily required in order to supply and remove the gas from the humidifying unit. Thus, the prior art meets the necessary functional and structural interrelationship to satisfy the claimed requirement as no further humidifier configuration has been positively set forth or defined by the present claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Examiner
Art Unit 1745

A handwritten signature in black ink, appearing to read 'RAY', with a long horizontal line extending to the right.